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EXAMINER	
SHAH, NILESH R	

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2127	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/676,552	Applicant(s) GINSBERG, MICHAEL
	Examiner Nilesh R Shah	Art Unit 2127

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 September 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 September 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☒ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Yang et al (5,819,286) (hereinafter Yang)

As per claim 1, Yang teaches a machine-readable medium having a data structure stored thereon for efficiently ordering a plurality of entities, each entity having a rank within a plurality of ranks, the data structure comprising:

a horizontally linked list linking at least a subset of the plurality of entities in at least a descending rank order direction, each entity in the horizontally linked list having a unique rank as compared to the ranks of other entities in the horizontally linked list (col. 10 –line 10 –col. 11 line 39) (' Next, the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical direction and a 1-D list in the temporal direction for each clip in the set of clips that can possibly satisfy the video query. This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a video clip of a particular corresponding icon (as

indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the horizontal direction) of the video query.'); and

an array having a plurality of array entries over which the plurality of ranks are distributed such that each array entry has a corresponding range of ranks, at least one array entry each pointing to an entity of the plurality of entities having a greatest rank within the corresponding range of ranks for the array entry. (col. 10 –line 10 –col. 11 line 39, claim 4) ('Next, the processor 110 sequentially orders (e.g., sorts) the symbols in each of the sets depending on their rank in the direction of the 1-D list (horizontal, vertical or temporal). FIG. 13 illustrates the sequential ordering of the symbols of the horizontal 1-D list 500.') ('determining the rank of each symbol of each of said sets formed in step (i), wherein rank is an order of precedence, in said respective direction of said 1-D list, of said icons')

As per claim 2, Yang teaches a medium data structure: further comprising at least one vertically linked list, each vertically linked list linking in at least one direction a corresponding subset of the plurality of entities having an identical rank (col. 10 –line 10 –col. 11 line 39) (' Next, the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical direction and a 1-D list in the temporal (second vertical) direction for each clip in the set of clips that can possibly satisfy the video query. This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a video clip of a particular corresponding icon (as

indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the horizontal direction) of the video query.') ('Otherwise, those symbols with equal ranks are in an equivalent class; those symbols with different ranks are in different classes.')

As per claim 3, Yang teaches a medium, wherein each vertically linked list links the corresponding subset of the plurality of entities in a first vertical direction and a second vertical direction (col. 10 –line 10 –col. 11 line 39, Claim 1, Claim 4) ('constructing a 1-D list for said horizontal direction, a 1-D list for said vertical direction and a 1-D list for said temporal (second vertical) direction, wherein each of said 1-D lists comprises a plurality of sets of symbols of icons, which icons are contained in said signature of said executed video query, and wherein each of said sets contains a permutation of symbols of said icons which satisfy said video query in said respective direction of said 1-D list, forming the intersection of said 1-D list for said horizontal direction, said 1-D list for said vertical direction and said 1-D list for said temporal direction') (' Next, the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical direction and a 1-D list in the temporal direction for each clip in the set of clips that can possibly satisfy the video query. This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a video clip of a particular corresponding icon (as indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the horizontal direction) of the video query.')

('Otherwise, those symbols with equal ranks are in an equivalent class; those symbols with different ranks are in different classes.')('determining the rank of each symbol of each of said sets formed in step (i), wherein rank is an order of precedence, in said respective direction of said 1-D list, of said icons')

As per claim 4, Yang teaches a the data structure, further comprising a head pointer pointing to an entity having a greatest rank of the plurality of ranks of the plurality of entities (col. 10 –line 10 –col. 11 line 39) (' Next, the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical direction and a 1-D list in the temporal direction for each clip in the set of clips that can possibly satisfy the video query. This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a video clip of a particular corresponding icon (as indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the horizontal direction) of the video query.') ('Otherwise, those symbols with equal ranks are in an equivalent class; those symbols with different ranks are in different classes.')

As per claim 5, Yang teaches a medium wherein the horizontally linked list further links at least the subset of the plurality of entities in an ascending rank order direction (col. 10 –line 10 –col. 11 line 39, Claim 4) (' Next, the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical direction and a 1-D

list in the temporal direction (second vertical) for each clip in the set of clips that can possibly satisfy the video query. This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a video clip of a particular corresponding icon (as indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the horizontal direction) of the video query.') ('Otherwise, those symbols with equal ranks are in an equivalent class; those symbols with different ranks are in different classes.') ('determining the rank of each symbol of each of said sets formed in step (i), **wherein rank is an order of precedence,** in said respective direction of said 1-D list, of said icons')

As per claim 6, Yang teaches a medium wherein the plurality of ranks are equally distributed over the plurality of array entries (col. 10 –line 10 –col. 11 line 39, Claim 4) (' Next, the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical direction and a 1-D list in the temporal direction for each clip in the set of clips that can possibly satisfy the video query. This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a video clip of a particular corresponding icon (as indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the horizontal direction) of the video query.') ('Otherwise, those symbols with equal ranks are in an equivalent class; those symbols with different ranks are in different classes.') (' Next,

the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical direction and a 1-D list in the temporal direction for each clip in the set of clips that can possibly satisfy the video query. This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a video clip of a particular corresponding icon (as indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the horizontal direction) of the video query.') ('Otherwise, those symbols with equal ranks are in an equivalent class; those symbols with different ranks are in different classes.') ('determining the rank of each symbol of each of said sets formed in step (i), wherein rank is an order of precedence, in said respective direction of said 1-D list, of said icons')

As per claim 7, Yang teaches a medium wherein the entity having the greatest rank within the corresponding range of ranks for each of one or more of the at least one array entry is one of a subset of the plurality of entities having the greatest rank within the corresponding range of ranks for the array entry (col. 10 –line 10 –col. 11 line 39, Claim 4) (' Next, the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical direction and a 1-D list in the temporal direction for each clip in the set of clips that can possibly satisfy the video query. This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a

video clip of a particular corresponding icon (as indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the horizontal direction) of the video query.') ('Otherwise, those symbols with equal ranks are in an equivalent class; those symbols with different ranks are in different classes.') (' Next, the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical direction and a 1-D list in the temporal direction for each clip in the set of clips that can possibly satisfy the video query. This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a video clip of a particular corresponding icon (as indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the horizontal direction) of the video query.') ('Otherwise, those symbols with equal ranks are in an equivalent class; those symbols with different ranks are in different classes.') ('determining the rank of each symbol of each of said sets formed in step (i), wherein rank is an order of precedence, in said respective direction of said 1-D list, of said icons')

As per claim 8, Yang teaches a medium wherein at least one array entry of the plurality of array entries each points to null, corresponding to no entity within the plurality of entities having a rank within the corresponding range of ranks for the array entry (col. 10 –line 10 –col. 11 line 39, Claim 4) (' Next, the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical direction and a 1-D list in the temporal direction for each clip in the set of clips that can possibly satisfy the video query.

This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a video clip of a particular corresponding icon (as indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the horizontal direction) of the video query.') ('Otherwise, those symbols with equal ranks are in an equivalent class; those symbols with different ranks are in different classes.') (' Next, the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical direction and a 1-D list in the temporal direction for each clip in the set of clips that can possibly satisfy the video query. This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a video clip of a particular corresponding icon (as indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the horizontal direction) of the video query.') ('Otherwise, those symbols with equal ranks are in an equivalent class; those symbols with different ranks are in different classes.') ('determining the rank of each symbol of each of said sets formed in step (i), wherein rank is an order of precedence, in said respective direction of said 1-D list, of said icons')

As per claim 9, Yang teaches a medium wherein each entity of the plurality of entities is a thread, the rank of the entity is a priority for the thread, and the array is a priority queue (col. 10 –line 10 –col. 11 line 39, Claim 4) (' Next, the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical direction

and a 1-D list in the temporal direction for each clip in the set of clips that can possibly satisfy the video query. This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a video clip of a particular corresponding icon (as indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the horizontal direction) of the video query.') ('Otherwise, those symbols with equal ranks are in an equivalent class; those symbols with different ranks are in different classes.') (' Next, the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical direction and a 1-D list in the temporal direction for each clip in the set of clips that can possibly satisfy the video query. This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a video clip of a particular corresponding icon (as indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the horizontal direction) of the video query.') ('Otherwise, those symbols with equal ranks are in an equivalent class; those symbols with different ranks are in different classes.') ('determining the rank of each symbol of each of said sets formed in step (i), wherein rank is an order of precedence, in said respective direction of said 1-D list, of said icons')

As per claim 10, Yang teaches a method for removing a particular entity from a plurality of entities, each entity having a rank within a plurality of ranks, the method comprising: in response

to determining that the particular entity is present within a vertically linked list linking in at least one direction a corresponding subset of the plurality of entities having an identical rank, the corresponding subset including the particular entity, delinking the particular entity from the vertically linked list col. 10 –line 10 –col. 11 line 39) (' Next, the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical direction and a 1-D list in the temporal direction for each clip in the set of clips that can possibly satisfy the video query. This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a video clip of a particular corresponding icon (as indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the horizontal direction) of the video query.') ('Otherwise, those symbols with equal ranks are in an equivalent class; those symbols with different ranks are in different classes.') ('Next, the processor 110 sequentially orders (e.g., sorts) the symbols in each of the sets depending on their rank in the direction of the 1-D list (horizontal, vertical or temporal). FIG. 13 illustrates the sequential ordering of the symbols of the horizontal 1-D list 500.') ('determining the rank of each symbol of each of said sets formed in step (i), wherein rank is an order of precedence, in said respective direction of said 1-D list, of said icons')

in response to determining that the particular entity is present within a horizontally linked list linking at least a subset of the plurality of entities in at least in a descending rank order direction,

the subset including the particular entity, delinking the particular entity from the horizontally linked list (col. 10 –line 10 –col. 11 line 39) (' Next, the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical direction and a 1-D list in the temporal direction for each clip in the set of clips that can possibly satisfy the video query. This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a video clip of a particular corresponding icon (as indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the horizontal direction) of the video query.'); and

in response to determining that an array entry of a plurality of array entries of an array over which the plurality of ranks are distributed points to the particular entity, adjusting the array entry to point to one of null and another one of the plurality of entities (col. 10 –line 10 –col. 11 line 39) (' Next, the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical direction and a 1-D list in the temporal direction for each clip in the set of clips that can possibly satisfy the video query. This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a video clip of a particular corresponding icon (as indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the horizontal direction) of the video query.') ('Next, the processor 110

sequentially orders (e.g., sorts) the symbols in each of the sets depending on their rank in the direction of the 1-D list (horizontal, vertical or temporal). FIG. 13 illustrates the sequential ordering of the symbols of the horizontal 1-D list 500.') ('determining the rank of each symbol of each of said sets formed in step (i), wherein rank is an order of precedence, in said respective direction of said 1-D list, of said icons')

As per claim 11, Yang teaches a method wherein the array entry has a corresponding range of ranks, and adjusting the array entry to point to one of null and another one of the plurality of entities comprises, in response to determining that the particular entity was present within the vertically linked list, adjusting the array entry to point to a next entity within the vertically linked list (col. 10 –line 10 –col. 11 line 39) (' Next, the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical direction and a 1-D list in the temporal direction for each clip in the set of clips that can possibly satisfy the video query. This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a video clip of a particular corresponding icon (as indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the horizontal direction) of the video query.') ('Otherwise, those symbols with equal ranks are in an equivalent class; those symbols with different ranks are in different classes.')

As per claim 12, Yang teaches a method wherein adjusting the array entry to point to one of null and another one of the plurality of entries further comprises, otherwise, in response to determining that the particular entity was present within the horizontally linked list, and that the rank of a next entity within the horizontally linked list is within the corresponding range of ranks for the array entry, adjusting the array entry to point to the next entity within the horizontally linked list (col. 10 –line 10 –col. 11 line 39) (' Next, the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical direction and a 1-D list in the temporal direction for each clip in the set of clips that can possibly satisfy the video query. This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a video clip of a particular corresponding icon (as indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the horizontal direction) of the video query.')

As per claim 13, Yang teaches a method wherein adjusting the array entry to point to one of null and another one of the plurality of entries further comprises, otherwise, adjusting the array entry to point to null (col. 10 –line 10 –col. 11 line 39, Claim 1, Claim 4) ('constructing a 1-D list for said horizontal direction, a 1-D list for said vertical direction and a 1-D list for said temporal direction, wherein each of said 1-D lists comprises a plurality of sets of symbols of icons, which icons are contained in said signature of said executed video query, and wherein each of said sets contains a permutation of symbols of said icons which satisfy said video query in said respective

direction of said 1-D list, forming the intersection of said 1-D list for said horizontal direction, said 1-D list for said vertical direction and said 1-D list for said temporal direction') (' Next, the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical direction and a 1-D list in the temporal direction for each clip in the set of clips that can possibly satisfy the video query. This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a video clip of a particular corresponding icon (as indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the horizontal direction) of the video query.') ('Otherwise, those symbols with equal ranks are in an equivalent class; those symbols with different ranks are in different classes.')('determining the rank of each symbol of each of said sets formed in step (i), wherein rank is an order of precedence, in said respective direction of said 1-D list, of said icons')

As per claim 14, Yang teaches a method further comprising, in response to determining that a head pointer pointing to an entity having a greatest rank of the plurality of ranks of the plurality of entities points to the particular entity, adjusting the head pointer to point to another one of the plurality of entities ('Next, the processor 110 sequentially orders (e.g., sorts) the symbols in each of the sets depending on their rank in the direction of the 1-D list (horizontal, vertical or temporal). FIG. 13 illustrates the sequential ordering of the symbols of the horizontal 1-D list 500.') ('determining the rank of each symbol of each of said sets formed in step (i), wherein rank is an order of precedence, in said respective direction of said 1-D list, of said icons')

As per claim 15, Yang teaches a method, wherein adjusting the head pointer to point to another one of the plurality of entities comprises, in response to determining that the particular entity was present within the vertically linked list, adjusting the head pointer to point to a next entity with the vertically linked list (col. 10 –line 10 –col. 11 line 39, Claim 1, Claim 4) ('constructing a 1-D list for said horizontal direction, a 1-D list for said vertical direction and a 1-D list for said temporal direction, wherein each of said 1-D lists comprises a plurality of sets of symbols of icons, which icons are contained in said signature of said executed video query, and wherein each of said sets contains a permutation of symbols of said icons which satisfy said video query in said respective direction of said 1-D list, forming the intersection of said 1-D list for said horizontal direction, said 1-D list for said vertical direction and said 1-D list for said temporal direction') (' Next, the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical direction and a 1-D list in the temporal direction for each clip in the set of clips that can possibly satisfy the video query. This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a video clip of a particular corresponding icon (as indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the horizontal direction) of the video query.') ('Otherwise, those symbols with equal ranks are in an equivalent class; those symbols with different ranks are in different classes.')('determining the rank of each symbol of each of said sets formed in step (i), wherein rank is an order of precedence, in said respective direction of said 1-D list, of said icons')

As per claim 16, Yang teaches a method wherein adjusting the head pointer to point to another one of the plurality of entities comprises, otherwise, in response to determining that the particular entity was present within the horizontally linked list, adjusting the head pointer to point to a next entity within the horizontally linked list (col. 10 –line 10 –col. 11 line 39) (' Next, the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical direction and a 1-D list in the temporal direction for each clip in the set of clips that can possibly satisfy the video query. This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a video clip of a particular corresponding icon (as indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the horizontal direction) of the video query.')

As per claim 17, Yang teaches a method, wherein each entity of the plurality of entities is a thread, the rank of the entity is a priority for the thread, and the array is a priority queue (col. 10 –line 10 –col. 11 line 39) ('Next, the processor 110 sequentially orders (e.g., sorts) the symbols in each of the sets depending on their rank in the direction of the 1-D list (horizontal, vertical or temporal). FIG. 13 illustrates the sequential ordering of the symbols of the horizontal 1-D list 500.') ('determining the rank of each symbol of each of said sets formed in step (i), wherein rank is an order of precedence, in said respective direction of said 1-D list, of said icons')

As per claim 18, Yang teaches a method wherein the method is performed by execution of a computer program stored on a machine-readable medium by a processor (col. 5 lines 27-60) ('FIG. 4 shows an apparatus 100 for indexing a video database and executing queries on the indexed video database according to an embodiment of the present invention. As shown, the apparatus 100 has a processor 110, such as an Intel.TM. Pentium.TM. microprocessor or a Motorola.TM. PowerPC 603.TM. microprocessor. The processor 110 executes suitable software for carrying out the functions described below. The apparatus 100 also has a main memory 120 and a disk memory 130 for storing the video database and queries executed thereon. The processor 110, main memory 120 and disk memory 130 are connected to a bus 190 which transfers data, e.g., program instruction or video information, between the devices connected thereto. A display device 150, such as an liquid crystal display (LCD) or cathode ray tube (CRT) monitor is provided which may be connected to the bus 190 via a graphics adaptor (not shown).').

As per claim 19, Yang teaches a method for adding a new entity having a rank within a plurality of ranks to a plurality of entities also each having a rank within the plurality of ranks, the method comprising of a plurality of array entries of an array over which the plurality of ranks are distributed such that each array entry has a corresponding range of ranks, determining the array entry having the corresponding range of ranks in which the rank of the new entity lies (col. 10 – line 10 –col. 11 line 39) (' Next, the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical direction and a 1-D list in the temporal direction for each clip in the set of clips that can possibly satisfy the video

query. This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a video clip of a particular corresponding icon (as indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the horizontal direction) of the video query.');

adjusting the array entry having the corresponding range of ranks into which the rank of the new entity lies to point to the new entity in response to determining that the array entry currently points to null (col. 10 –line 10 –col. 11 line 39, Claim 1, Claim 4) ('constructing a 1-D list for said horizontal direction, a 1-D list for said vertical direction and a 1-D list for said temporal direction, wherein each of said 1-D lists comprises a plurality of sets of symbols of icons, which icons are contained in said signature of said executed video query, and wherein each of said sets contains a permutation of symbols of said icons which satisfy said video query in said respective direction of said 1-D list, forming the intersection of said 1-D list for said horizontal direction, said 1-D list for said vertical direction and said 1-D list for said temporal direction') (' Next, the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical direction and a 1-D list in the temporal direction for each clip in the set of clips that can possibly satisfy the video query. This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a video clip of a particular corresponding icon (as indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the

horizontal direction) of the video query.') ('Otherwise, those symbols with equal ranks are in an equivalent class; those symbols with different ranks are in different classes.')('determining the rank of each symbol of each of said sets formed in step (i), wherein rank is an order of precedence, in said respective direction of said 1-D list, of said icons');

adjusting the array entry having the corresponding range of ranks into which the rank of the new entity lies to point to the new entity in response to determining that the array entry current points to an entity having a rank less than the rank of the new entity (col. 10 –line 10 –col. 11 line 39) (' Next, the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical direction and a 1-D list in the temporal direction for each clip in the set of clips that can possibly satisfy the video query. This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a video clip of a particular corresponding icon (as indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the horizontal direction) of the video query.')

linking the new entity into a vertically linked list linking in at least one direction a corresponding subset of the plurality of entities having an identical rank, in response to determining that the rank of the new entity is equal to the rank of any other entity within the plurality of entities (col. 10 –line 10 –col. 11 line 39, Claim 1, Claim 4) ('constructing a 1-D list for said horizontal direction, a 1-D list for said vertical direction and a 1-D list for said temporal direction, wherein

each of said 1-D lists comprises a plurality of sets of symbols of icons, which icons are contained in said signature of said executed video query, and wherein each of said sets contains a permutation of symbols of said icons which satisfy said video query in said respective direction of said 1-D list, forming the intersection of said 1-D list for said horizontal direction, said 1-D list for said vertical direction and said 1-D list for said temporal direction') (' Next, the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical direction and a 1-D list in the temporal direction for each clip in the set of clips that can possibly satisfy the video query. This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a video clip of a particular corresponding icon (as indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the horizontal direction) of the video query.') ('Otherwise, those symbols with equal ranks are in an equivalent class; those symbols with different ranks are in different classes.')('determining the rank of each symbol of each of said sets formed in step (i), wherein rank is an order of precedence, in said respective direction of said 1-D list, of said icons'); and

otherwise, linking the new entity into a horizontally linked list linking at least a subset of the plurality of entities in at least a descending rank order direction, each entity in the horizontally linked list having a unique rank as compared to the ranks of other entities in the horizontally linked list (col. 10 –line 10 –col. 11 line 39) (' Next, the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical

direction and a 1-D list in the temporal direction for each clip in the set of clips that can possibly satisfy the video query. This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a video clip of a particular corresponding icon (as indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the horizontal direction) of the video query.')

As per claim 20, Yang teaches a method, further comprising adjusting a head pointer pointing to an entity having a greatest rank of the plurality of ranks of the plurality of entities to point to the new entity in response to determining that the rank of the new entity is greater than the rank of the entity of the plurality of entities to which the head pointer currently points (col. 10 –line 10 – col. 11 line 39) (' Next, the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical direction and a 1-D list in the temporal direction for each clip in the set of clips that can possibly satisfy the video query. This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a video clip of a particular corresponding icon (as indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the horizontal direction) of the video query.').

As per claim 21, Yang teaches a method wherein each entity of the plurality of entities is a thread, the rank of the entity is a priority for the thread, and the array is a priority queue (col. 10 –line 10 –col. 11 line 39) (' Next, the processor 110 executes step 320. In step 320, the processor 110 constructs a 1-D list in the horizontal direction, a 1-D list in the vertical direction and a 1-D list in the temporal direction for each clip in the set of clips that can possibly satisfy the video query. This is achieved as follows. Consider as an example the horizontal (X) direction. The processor 110 utilizes the video index base to construct a sequence of sets of symbols of a video clip. Each set of symbols contains all of the symbols of a video clip of a particular corresponding icon (as indicated in the index base). One set of symbols is provided which corresponds to each icon of the 1-D string X (in the horizontal direction) of the video query.').

As per claim 22, Yang teaches a method wherein the method is performed by execution of a computer program stored on a machine-readable medium by a processor (col. 5 lines 27-60) ('FIG. 4 shows an apparatus 100 for indexing a video database and executing queries on the indexed video database according to an embodiment of the present invention. As shown, the apparatus 100 has a processor 110, such as an Intel.TM. Pentium.TM. microprocessor or a Motorola.TM. PowerPC 603.TM. microprocessor. The processor 110 executes suitable software for carrying out the functions described below. The apparatus 100 also has a main memory 120 and a disk memory 130 for storing the video database and queries executed thereon. The processor 110, main memory 120 and disk memory 130 are connected to a bus 190 which transfers data, e.g., program instruction or video information, between the devices connected

thereto. A display device 150, such as an liquid crystal display (LCD) or cathode ray tube (CRT) monitor is provided which may be connected to the bus 190 via a graphics adaptor (not shown).')

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nilesh R Shah whose telephone number is 703-305-8105. The examiner can normally be reached on Monday-Friday 8am-4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Grant can be reached on 703-308-1108. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

NS

November 6, 2003

MAJID A. BANANKHAH
PRIMARY EXAMINER